REMARKS

Upon entry of the Amendment, Claims 1-12 and 14-20 will be pending in the application.

Claim 1 is amended to incorporate the subject matter of Claim 13, now canceled.

Claims 1, 2, and 4 are amended to recite "at least one magnetic layer", consistent with the recitation in original Claim 1.

New Claims 14-20 are added. Support for Claim 14 is found, for example, in the second and third paragraphs on page 21 of the specification as originally filed. Support for Claim 15 is found, for example, in Examples 1-8, which are described in the first and second paragraphs on page 28, where the dry thickness of the (single) magnetic layer in these examples is 0.1 μm. Support for Claim 16 is found, for example, in lines 5-20 on page 27. Support for Claims 17 and 20 is found, for example, in the description on page 16, two lines up from the last line on that page. Support for Claim 18 is found, for example, in lines 11-12 on page 8. Support for Claim 19 is found, for example, in the description in Examples 1-12 in Table 2. No new matter is added.

Entry of the Amendment is respectfully requested along with reconsideration and review of the claims on the merits.

Formal Matters

Applicants appreciate that the Examiner has acknowledged Applicants' claim for foreign priority and receipt of the priority document.

Applicants also appreciate that the Examiner has also reviewed and considered the references cited in the Information Disclosure Statements filed December 3, 2003 and April 1, 2004.

Response to the Claim Rejection - 35 U.S.C. § 112

Claims 1 and 12 are rejected under 35 U.S.C. § 112, second paragraph, as assertedly being indefinite. The Examiner asserts that the term "fine" in Claims 1 and 12 is a relative term which renders the claims indefinite. The Examiner states that term "fine" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Applicants respectfully traverse this rejection.

Without conceding that the rejection has merit, Applicants amend Claims 1 and 12 to remove the term "fine" from the phrase "ferromagnetic fine powder" in order to advance prosecution. Entry of the amendment is respectfully requested. The specification defines that the major axis length of the magnetic particles (ferromagnetic fine powder) is preferably 0.05-0.25 μm, in the broadest range (see page 14, lines 14-16). Thus, Claims 1 and 12 are in compliance with 35 U.S.C. § 112, second paragraph.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 112, second paragraph.

Response to Claim Rejections - 35 U.S.C. § 103

Claims 1-13 are rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Inaba et al. (US 6,074,724) in view of Nishimatsu et al. (US 4,596,747).

The Examiner cites Inaba et al. as disclosing a magnetic recording medium according to the present invention, comprising a non magnetic support, a lower layer comprising a non magnetic powder dispersed in a binder, and a magnetic layer comprising ferromagnetic powder dispersed in a binder, where the binder may be a polyurethane resin having a glass transition temperature of 100°C to 200°C, and where the magnetic layer of Inaba et al. has a surface with projections in the ranges claimed in Claims 1 and 2.

The Examiner asserts that Inaba et al. discloses that the non magnetic support may be provided with an adhesive layer on the side to be coated with the magnetic composition, but the Examiner gives no specific reference for this assertion. The Examiner recognizes that Inaba et al does not teach details of the adhesive layer.

However, the Examiner cites Nishimatsu et al as teaching a radiation cured layer according to the present invention, and concludes that it would have been obvious to one of ordinary skill in the art to use the primer of Nishimatsu et al as the adhesive layer in the medium of Inaba et al, motivated by the desire to improve smoothness and eliminate the necessity of using volatile solvents.

Applicants respond as follows.

As previously noted, Claim 1 is amended to recite a preferred range for the magnetic layer as having a thickness of 0.05 to 1.0 μm.

Applicants traverse the Examiner's obviousness rejection on at least the basis that the combination of Inaba with Nishimatsu fails to achieve the present invention. Indeed, one of

ordinary skill would not even be motivated to combine Inaba et al. with Nishimatsu et al. to achieve the present invention.

The Present Invention: The present invention provides a remarkably smooth magnetic recording medium having excellent electromagnetic conversion characteristics by coating a non-magnetic support with a radiation curing compound, curing it by exposure to radiation, and then providing a lower layer and a magnetic layer, so that projections on the surface of the non-magnetic support can be buried and, in particular, micro projections of the lower layer and the magnetic layer originating from the projections of the support, which are thought to have a large effect on the electromagnetic conversion characteristics can be decreased (Page 4, first full paragraph).

Moreover, in comparison with conventional binders, use of a binder having a high glass transition temperature of 100 to 200°C enables plastic flow of a coating due to heat of friction during repetitive sliding to be suppressed, thereby giving excellent transport durability (Page 4, second full paragraph).

Combined Use of the Radiation-Cured Layer/the Lower Layer Arrangement and High Tg Magnetic Binder: The present inventors discovered that a magnetic recording medium having a thin magnetic layer can realize excellent electromagnetic conversion characteristics, low dropout, and excellent transport characteristics by decreasing the number of projections on the surface on the magnetic layer. This is accomplished by burying projections on the surface of the non-magnetic support by the combined use of the radiation-cured layer, the lower layer and high Tg magnetic binder (see Claim 1).

One of ordinary skill in the art would not be motivated to add Nishimatsu's primer coating layer, or radiation-cured layer, to Inaba's second embodiment since Inaba's second embodiment already accomplishes relatively smooth surface on the magnetic layer. Inaba's second embodiment already accomplishes relative smoothness of the magnetic layer's surface using an undercoat layer, such that adding an additional primer coating layer for the same purpose would not be motivated as it would not achieve any additional benefit vis-à-vis the additional structure and costs associated with adding Nishimatsu's primer coating layer. Also, as Inaba already uses carbon black in its undercoat layer, any benefits obtained from using carbon black would already be achieved in Inaba's embodiment.

In addition, Nishimatsu has an object to provide a magnetic recording medium of a low electrostatic property wherein the electroconductive material (such as carbon black) is dispersed only in the primer layer and not in the magnetic layer (see column 2, lines 41-45 and 63-64), and Nishimatsu does not disclose or suggest a backing layer wherein carbon black is dispersed. On the other hand, Inaba's magnetic layer and lower layer comprise carbon black as illustrated in Examples 4 to 6 in addition of a backing layer having carbon black (see column 26, line 36 to column 27, line 40 and cited description therein). Therefore an ordinary artisan would not be motivated to incorporate Nishimatsu's primer layer into Inaba's second embodiment.

The present inventors found that the number of projections on the surface of the magnetic layer is important in a magnetic recording medium having a thin magnetic layer, and that the desired range of the projections on the surface of the magnetic layer could be achieved by the combination of the radiation-cured layer/the lower layer arrangement and a high Tg (100-200°C)

binder in the magnetic layer. Applicants refer the Examiner to the results of Examples 1-4 versus the result of comparative Example 1, which shows the importance of the presence of the radiation-cured layer. The comparison between Examples 1 to 12 and Comparative Examples 2 to 4 shows that the glass-transition temperature of 100 to 200°C in the magnetic binder is necessary to achieve the number of projections on the surface on the magnetic layer of 5 to 1,000 per 100 μm^2.

The number of minute projections having 10-20 nm heights per 900 μm^2 (M_{10}) is shown in Inaba as Tables 14, 15, and 16. Applicants note that the polyurethanes L and M used in Examples 39 to 47 have Tg values lower than 100°C as shown in Table 8 (L: 94°C, and M: 38°C). Therefore, Inaba's examples do not disclose either a radiation-cured layer or the binder of the magnetic layer having a glass transition temperature of 100°C to 200°C.

Even if a radiation-cured layer, a lower layer, a high Tg magnetic binder or the number of minute projections may have been independently known to one of ordinary skill in the art, Applicants respectfully submit that a mere teaching by itself is not sufficient to provide motivation for an ordinary artisan to arrive at the present invention. Instead, one of ordinary skill in the art would actually not have expected that the claimed combination according to the present invention provides excellent electromagnetic conversion characteristics, low dropout, and excellent transport characteristics. For at least the foregoing reasons, the present invention is not rendered obvious over the combination of Inaba in view of Nishimatsu.

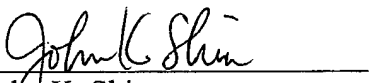
Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a).

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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